

noticed apparently, till I had gained sufficiently on M'Guire to make him hear. I then coo-eeed *once*; he turned and came back to meet me; but at the sound of my coo-ee the fish started off seawards out of sight (under water), and doubled again in-shore, but so rapidly as to leave both outward and inward "ridge" on the water distinctly visible at once, like a wide V with quite a sharp corner. It gave me the idea of two fishes, the one darting outwards, the other crossing its track inward at the same moment.

"Not knowing where it might show up next, but satisfied that it had come in-shore again, I tried by pointing seaward to direct M'Guire's attention that way.

"Just as I met him the fish again came to the surface, showing gradually more and more of his length, till, when he was almost at rest, and all apparently was in view, I estimated the length to be 60 feet, straight and taper, like a long spar, with the butt-end, his head and shoulders, showing well above the surface.

"I can only describe the head as like the end of a log, bluff, about two feet diameter; on the back we noticed, showing very distinctly above water, several square-topped fins."

I here make an exact tracing from Mr. Brown's letter of his sketch:—



"It was now getting rather too dark to see details distinctly. The fish proceeded towards Lockville, and I turned homeward. M'Guire said he would go on to Lockville jetty and look out for him there.

"Whether he saw him again I know not, but M'Mullan, the fisherman, told me next morning that he had seen it about fifty yards from that jetty, and it looked to him about twenty feet long. So it did to me while in motion; only when at rest for a moment did its whole length show up sufficiently. What its propelling power was I cannot say from observation; I saw no lateral fins and no fish-tail.

"When it started away at the sound of my voice, it was with the rapid movement of a pike or sword-fish, and yet the thick, bluff head had but little resemblance to a snake's.

"There was an unusual abundance of fish close in-shore the same afternoon, yet when I saw the stranger there were certainly no fish of which it could be in pursuit."

Since the year 1848, when the captain and officers of a British man-of-war gave evidence that they passed within 100 yards of a snake which they estimated to be 60 feet in length above water with probably 40 feet beneath, I do not know of any more clear account than the above. Many independent accounts of the existence of marine monsters have been placed on record, and it seems mere folly to treat these repeated reports with ridicule.

I trust that your readers will no longer doubt that "the age of incredulity" is past.

Fremantle, W. Australia, May 19

H. C. BARNETT,  
Colonial Surgeon

#### Mechanical Difficulty in Growth of Plants and Animals

In reading reports and discussions on natural science, to which I am, from great pressure of other occupation and studies, only able to give a cursory attention, I cannot find any allusion to the *mechanical* means by which the growth of organised creatures is produced, especially when that growth takes place in opposition to the direction of gravitation. The explanation at which I have arrived of this phenomenon may probably be known to physiologists, and may have been acknowledged or disproved; any way I think the subject might be fairly discussed in a popular journal such as yours.

The growth of the roots of a plant and of drooping branches not being in opposition to the attraction of the earth, presents only the difficulties which arise from vital action, but the increase of a plant in height requires also explanation as to how the work is done of lifting vegetable matter higher and higher; capillary attraction can bring fluid to the summit of a tube such as the stem of a plant, but the fluid cannot overflow at the top, since in that case the matter of the tube would lift the fluid above itself; but when a tube is full of fluid, additional heat expanding this fluid would cause it to overflow at the top of the tube. As the sap contains solids in solution, from this the fluid could deposit an additional length of tubing, in which again an additional length of the column of fluid could be absorbed, so the heat of each day would build up a higher vertical tube, and capillary attraction would account for the cooler fluids produced at night

or rising from the root filling the vessels to their extremities. It seems to me, therefore, that the work done in lifting vegetable matter to the apex of a plant is due to the increase of heat in the daytime; that then the watery particles are evaporated, and the solid left deposited in the form of cylindrical vessels of small bore. In animals the prostrate posture of rest allows of growth without the difficulty of resisting gravitation; it is well known that deficiency of sleep (perhaps more accurately of rest) stunts the growth of animals, and that illnesses which keep children in bed during their years of growth almost always cause a rapid increase of stature; surely this arises from the newly-formed tissues having no gravitation to overcome, and therefore developing rapidly. Probably if a child were taught to take rest in a vertical position, it would not grow tall, but develop in breadth.

The work done in increasing the stature of plants every year must be enormous; in one summer thousands of tons of vegetable tissue must be raised through heights varying from a few inches in an oak, to twenty or thirty feet in a hopbine, and much more in a liano, or tropical creeper. I presume in winter the cold constricts the vessels, and so prevents sap from rising, hence there is no growth at that season.

Taunton College School

H. P. KNAPTON

#### Chemical Notation

In Mr. Pattison Muir's very interesting article on thermo-chemical investigation (*NATURE*, vol. xx. p. 8, I find the following:—

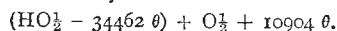
"That system of notation which is now employed in chemistry, although of the greatest value, is nevertheless far from being perfect; it fails to tell anything concerning the changes in forms of energy involved in those changes of distribution of mass (matter?) which it formulates."

The author does not, however, propose any addition to the usual notation for the purpose of indicating the transformations of energy which take place in chemical transformations, yet this may be done very simply.

The symbol for water is  $\text{HO}\frac{1}{2}$ . This states with perfect clearness the fact that a molecule of water has been formed by the combination of a molecule of hydrogen with a half molecule of oxygen, but it leaves out of account the important fact that in the act of their combination 34462 heat-units have been given out. If we call a heat-unit  $\theta$ , the symbol for water will then be  $\text{HO}\frac{1}{2} - 34462\theta$ ; the negative sign indicating that the heat has been *parted with*. I propose to call such compounds thermo-negative. Products of perfect combustion, such as water and carbonic acid, are necessarily thermo-negative.

There are thermo-positive compounds, of which protoxide of nitrogen is one of the best understood. According to Fabre and Silbermann, 1154 heat-units are given out in the separation from protoxide of nitrogen of one gramme of oxygen. It is obvious that this heat must have been *taken up* in the formation of the protoxide. Multiplying 1154 by 8 for the equivalent of oxygen, we get 9232 as the thermal equivalent of the protoxide, and we write its symbol  $\text{NO} + 9232\theta$ .

Peroxide of hydrogen is usually written  $\text{HO}$ , but this, from the point of view of chemical structure, is altogether wrong. Fabre and Silbermann "estimate the heat evolved during the liberation of one gramme of oxygen from peroxide of hydrogen at 1363 heat-units. Multiplying by 8 as before, we have 10904 as its thermal equivalent, regarding it as a thermo-positive oxide of water, and we write its symbol



JOSEPH JOHN MURPHY

Old Forge, Dunmurry, Co. Antrim, July 8

#### Local Colour-Variation in Lizards

MR. HENRY HILLYER GIGLIOLI remarks (*NATURE*, vol. xix. p. 97) that the common lizard (*Podarcis muralis*) constantly presents dark varieties on islets adjoining small islands. A similar case has come under my observation in the herpetological fauna of this country. *Ameiva* (cnemidophorus) *vulgaris*, Licht., is very common all over Venezuela, and though it varies considerably in colour, it is, on the mainland, never black, as on the small islands of Los Roques and Orchila, which lie a short distance off our Caribbean coast. Both islands have rather extensive sandy beaches, covered with a very scanty vegetation, so that, *mutatis mutandis*, they are, in the very words Mr. Giglioli uses when speaking of Filifa, painfully white in the glaring

tropical sun, the black lizards being therefore most conspicuous. Prof. Peters, of Berlin, to whom some years ago I sent specimens of these reptiles, called them in one of his letters *Cnemidophorus nigricolor*, but as I am not aware of his having published this name, I believe he got soon convinced of its true character as a melanotic variety. I may be allowed to add that I have mentioned this case already in my "Estudios sobre la Flora y Fauna de Venezuela" (Caracas, 1877), pp. 280, 281, when I also pointed out the difficulty of its explanation by the "struggle for existence" theory.

Caracas, May 15

A. ERNST

### Intellect in Brutes

1. THE following case was witnessed by my friend Dr. Rafael Villavicencio, of Caracas, during his stay last year in the town of Ponce, in the Island of Portorico:—

The little river in the neighbourhood of the town had risen, in consequence of heavy rains, and ran with rather considerable swiftness. In a certain place it is crossed by a road, where it was forded by a countryman sitting on his mule cart. His dog swam after him, but was taken down by the current and carried back to the bank. Then, after a moment's hesitation, the animal ran some distance up the bank, jumped into the water, and managed to reach the other side just where the road emerged from the river, acting thus precisely as a boatman might have done in similar circumstances.

2. To my friend Dr. Velasquez Level, a respectable physician of this city, and for several years a resident of the Island of Margarita, I am indebted for the following touching instance of the sagacity of a bitch. Her owner, for some reason or other, had destroyed all the female puppies in two successive litters. On her having brought forth a third one it was found that there were but three male puppies. The bitch, however, was observed to leave her whelps occasionally, and to return some time after. Being followed, she was discovered suckling three female puppies, which she had hidden under some brushwood, undoubtedly with the intention of saving them from the master's cruel hands. This case happened in a small place, called Juan Griego, on the northern side of the island.

Caracas, May 15

A. ERNST

### Intellect in Brutes—a Cat and a Mirror

MANY years ago at Carne farmhouse, where relatives of mine were then living, the household cat was observed to enter a bedroom in course of being spring-cleaned.

The looking-glass being on the floor the cat on entering was confronted with its own reflection and naturally concluded that he saw before him a real intruder on his domain.

Hostile demonstrations were the result, followed by a rush to the mirror and then meeting an obstacle to his vengeance, a fruitless cut round to the rear. This manoeuvre was more than once repeated with of course equal lack of success. Finally the cat was seen to deliberately walk up to the looking-glass keeping its eyes on the image, and then when near enough to the edge, to feel carefully with one paw behind, for the supposed intruder, whilst with its head twisted round to the front it assured itself of the persistence of the reflection.

The result of this experiment fully satisfied the cat that he had been the victim of delusion and never after would he condescend to notice mere reflections, though the trap was more than once laid for him.

THOS. B. GROVES

### Butterfly Swarms

EVEN your varied correspondence from all parts of the world has rarely furnished us with such a wonderfully complete and interesting personal observation as that of Mr. Sydney B. J. Skerichly (NATURE, vol. xx. p. 266) on the West African breeding-grounds of *Vanessa cardui*, and the almost mechanical impulse and simultaneity with which such a swarm as that which he describes free themselves from the pupa-case and set forth on their migration. Can any one throw a similar light on the periodicity of *Colias edusa*? *V. cardui* is a more constant insect in this neighbourhood than any other with which I am acquainted; but the numbers in June of this year were quite unusual. Also we remarked that they were very high-coloured and vigorous, unlike the ordinary washed-out hibernated specimens of early summer. As one of your correspondents has

remarked of his neighbourhood, so here *C. edusa* swarmed in 1877. It was the prevailing insect. In 1878 we had hardly a solitary example. The so-called *C. helice*—the pale variety of *C. edusa*—was frequent in 1877. I saw none of *C. hyale*; indeed, have never seen that insect here.

HENRY CECIL

Bregner, Bournemouth

### REPORT OF AN UNUSUAL PHENOMENON OBSERVED AT SEA

THE following Report to the Admiralty has been communicated to us for publication by Capt. Evans, C.B., F.R.S., the Hydrographer to the Navy:—

H.M.S. *Vulture*, Bahrein, May 17, 1879

SIR,—I have the honour to inform you that, at about 9.40 P.M. on May 15, when in lat.  $26^{\circ} 26' N.$  and long.  $53^{\circ} 11' E.$ , a clear, unclouded, starlight night, Arcturus being within some  $7^{\circ}$  of zenith, and Venus about to set; wind north-west, force 3, sea smooth, with slight swell from the same direction; ship on starboard tack, heading west-south-west and going three knots, an unusual phenomenon was seen from the vessel.

I noticed luminous waves or pulsations in the water, moving at great speed and passing under the ship from the south-south-west. On looking towards the east, the appearance was that of a revolving wheel with centre on that bearing, and whose spokes were illuminated, and looking towards the west a similar wheel appeared to be revolving, but in the opposite direction. I then went to the mizen top (fifty feet above water) with the first lieutenant, and saw that the luminous waves or pulsations were really travelling parallel to each other, and that their apparently rotatory motion, as seen from the deck, was caused by their high speed and the greater angular motion of the nearer than the more remote part of the waves. The light of these waves looked homogeneous, and lighter, but not so sparkling, as phosphorescent appearances at sea usually are, and extended from the surface well under water; they lit up the white bottoms of the quarter-boats in passing. I judged them to be twenty-five feet broad, with dark intervals of about seventy-five between each, or 100 from crest to crest, and their period was seventy-four to seventy-five per minute, giving a speed roughly of eighty-four English miles an hour.

From this height of fifty feet, looking with or against their direction, I could only distinguish six or seven waves; but, looking along them as they passed under the ship, the luminosity showed much further.

The phenomenon was beautiful and striking, commencing at about 6h. 3m. Greenwich mean time, and lasting some thirty-five minutes. The direction from which the luminous waves travelled changed from south-south-west by degrees to south-east and to east. During the last five minutes concentric waves appeared to emanate from a spot about 200 yards east, and these meeting the parallel waves from south-east did not cross, but appeared to obliterate each other at the moving point of contact, and approached the ship, inclosing an angle about  $90^{\circ}$ . Soundings were taken in twenty-nine fathoms; Stiffe's Bank, with fifteen to twenty fathoms, being west about one mile. The barometer was already at 29.25 from 8 to 12 P.M.

	At 8 P.M.	10.15 P.M.	Midnight.
Temperature of air	84	83	83
Temperature of sea-water	84	82	82

I observed no kind of change in the wind, the swell, or in any part of the heavens, nor were the compasses disturbed. A bucket of water was drawn, but was unfortunately capsized before daylight. The ship passed through oily-looking fish spawn on the evening of the 15th and morning of the 16th inst.—I have the honour to be, Sir, your obedient servant,

J. ELIOT PRINGLE, Commander